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CONTINGENCY TASK TRAINING

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The Contingency Task Training (CTT) project was undertaken at the request of Headquarters Air Training Command (HQ ATC) and the USAF Occupational Measurement Center (USAFOMC). Request for Personnel Research (RPR) 84-02 asked the Air Force Human Resources Laboratory (AFHRL) to develop a methodology for determining wartime critical tasks performed by all Air Force specialties (AFSs). The RPR was divided into two phases to meet requirements: development of scenario generation technology and data collection via coupling contingency scenarios to standard task surveys. AFHRL undertook creating the scenario generation technology. USAFOMC will conduct the task survey. Initial research into scenario design and creation was undertaken in order to produce understandable and believable contingency situations. The computer scenario generator developed in this effort will take the user through a step-by-step process in creating a scenario. Building a scenario involves selecting from the three main types of conflict intensity: high, mid, or low. Following its creation, the scenario is displayed as a one-page scenario description which can be printed out or saved on disk. An on-line "help" function is also included which contains definitions of all variables used.

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CONTINGENCY TASK TRAINING

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This is a Special Report prepared for Air Training Command and the USAF Occupational Measurement Center (USAFOMC).

SUMMARY

The Contingency Task Training (CTT) project was undertaken by the Air Force Human Resources Laboratory (AFHRL) at the request of Headquarters Air Training Command (HQ ATC) and the USAF Occupational Measurement Center (USAFOMC) to develop a methodology for determining wartime critical tasks performed by all Air Force specialties (AFSs). The project was divided into two phases to meet requirements: development of scenario generation technology, and data collection via coupling contingency scenarios to standard task surveys. AFHRL undertook creating the scenario generation technology. USAFOMC will conduct the task surveys as appropriate.

Initial research into scenario design and creation was undertaken in order to produce understandable and believable contingency situations. Following the preliminary investigation into scenario design, a pencil-and-paper scenario generator was developed. Building a scenario involved selecting from the three main types of conflict intensity: high, mid, or low. Depending on the intensity chosen, other variables necessary for building a proper scenario were then chosen and added to a general, prewritten, scenario form. Realizing the project would best serve its purpose in an automated form, the scenario generator was written as a Pascal program operable on any DOS-compatible microcomputer.

The computer scenario generator will take the user through a step-by-step process in creating a scenario. Following its creation, the scenario is displayed as a one-page scenario description which can be printed out or saved on disk. An on-line "help" function is also included which contains definitions of all variables used.

The final process step in the development effort was to validate the scenario generator by performing a "reality check." Several Air Force war planning offices were asked to evaluate the generator. Some recommendations were implemented into the generator; others which were beyond the scope of the effort are listed in this report for future consideration.

PREFACE

The Contingency Task Training (CTT) project was completed under Work Unit 77191911, "Measurement and Analysis of Job and Mission Requirements." The project was initiated in response to Request for Personnel Research 84-02, "Contingency Task Training Requirements." The requirement for this research was identified by the USAF Occupational Measurement Center (USAFOMC) and the Directorate for Command Research and Analysis, Headquarters Air Training Command (HQ ATC/XPC). The CTT project was conducted to provide USAFOMC with a viable methodology for determining which skills are critical for any enlisted Air Force specialty (AFS) during wartime. USAFOMC does not currently have a viable method for determining critical wartime or contingency tasks. The CTT scenario generator was designed to give them that capability. Critical tasks determined with the CTT technology could then be used by ATC in the development of training standards for all airmen. The intent of the CTT project is to provide a means to improve training and enhance the Air Force's means of meeting mission requirements.

The author would like to thank the following organizations and people for their help and assistance. A special thanks goes to the U.S. Army Low Intensity Conflict Study Group, U.S. Army Intelligence Center and School, Fort Huachuca, Arizona for allowing the use of their scenario variables developed for use in determining intelligence requirements for low-intensity conflicts. A great deal of gratitude is owed to 2Lt Jody Guthals for programming the scenario generator and for her help in producing the Contingency Scenario Generator User's Manual. Finally, thanks to Major Timothy Bergquist for his technical assistance, leadership, and faith in the project.

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I. INTRODUCTION

The Contingency Task Training (CTT) project was directed toward determining critical skills necessary in wartime or during mid- to low-intensity conflicts. Subsequently, this knowledge will be used for training purposes. The Air Force Human Resources Laboratory (AFHRL) was tasked with developing the methodology at the request of Headquarters Air Training Command (HQ ATC) and the U.S. Air Force Occupational Measurement Center (USAFOMC). The concept for CTT originated from a study performed by USAFOMC in 1979, entitled the Air Base Ground Defense Tactics Analysis. In that study, a task survey for security police (SP) personnel was combined with a simple scenario in order to determine which tasks are more important in the given situation--in that case, an outbreak of war in Europe (USAFOMC, 1979). The study was highly effective in restructuring the SP field, so much so that HQ ATC requested the technology be developed for combining task surveys with contingency scenarios. USAFOMC in turn produced Request For Personnel Research (RPR) 84-02, "Contingency Task Training Requirements," asking AFHRL to develop and validate the contingency technology.

Contingency Task Training was not undertaken by AFHRL until 1988. The request of the RPR to develop scenarios for use with task surveys and then test and validate the results necessitated dividing the project into two phases. Phase I was the development of the scenario generation technology. Phase II involved coupling scenarios to task surveys. The scenario task survey would then be sent to senior noncommissioned officers (NCOs) who would evaluate the scenario and rate each task listed for their respective jobs as to training emphasis. The results would then be validated against Specialty Training Standards (STSs) listing those skills on which each airman is to be instructed in order to reach certain levels of proficiency. Some of the skills in the STS are marked with an asterisk, signifying those tasks are to be taught during wartime; all others (not marked) are to be dropped from instruction. The method for choosing which tasks to mark has always been left up to senior NCOs. In the past, marking wartime skills has been done at the last minute during course reevaluation. Also, marked skills have never been validated.

The purpose of the CTT project was to provide a method to validate wartime skills. AFHRL initially undertook the task of creating the scenario generation technology and subsequent validation via task surveys. Manpower shortages necessitated terminating the project following the completion of Phase I, development of a scenario generator. Per agreement between AFHRL and USAFOMC, the Phase II task survey will be performed by USAFOMC.

II. OBJECTIVES

HQ ATC and USAFOMC were consulted on numerous occasions to determine exactly what they wanted for a scenario generator. Initially, USAFOMC requested that the scenario generator be able to generate natural disaster scenarios in addition to conflict/wartime scenarios. Further discussions led to the elimination of the natural disaster scenario generator because developing training for a disaster situation which occurs infrequently and to only a small region was not cost effective. It was further concluded the technology should concentrate on the mission of the Air Force, national defense, and the implementation of U.S. Armed Forces as part of national policy.

Designing a scenario is sometimes a complex undertaking. Certain criteria must be followed if the scenario is to be of any value. The objective is to build a scenario which is short, concise and realistic. A poorly written, believable scenario is better than a well-written, unbelievable one. According to experts in scenario generation, a scenario should provide only

the minimum amount of information needed to describe the situation (deLeon, 1973). The reason for this is that people can absorb only a finite amount of data, and fine detail tends to distract the reader from the overall purpose of the scenario. To achieve this economy of information, only the most important variables which make up a scenario have to be chosen. Because the scenario descriptions are intended for use with task surveys, they must "paint" a conflict situation which has application to all Air Force specialties (AFSs).

Another important factor in building the scenario generator is consideration of the user. The CTT scenario generator is intended for use by personnel inexperienced in creating a scenario. In addition, the user group, USAFOMC, is relatively small.

To ensure proper scenario generation protocol was followed and because most users are inexperienced it was decided the scenario generator should be automated. The best design was thought to be a small program which operated on any DOS-compatible microcomputer. The inclusion of an on-line "help" which would provide definitions to all contingency variables was also deemed important

III. APPROACH

Initial Research

The first step was to investigate existing scenario generators. For the most part, scenario generators are designed for use in war games. They are mainly concerned with overall battle management and not with the individual. The standard scenario generators used for combat tactics were therefore of little or no use for CTT.

Fortunately, a preliminary scenario design system was being developed by the U.S. Army for use in training intelligence officers in appropriate intelligence gathering skills. The Low Intensity Conflict Study Group of the U.S. Army Intelligence Center and School at Fort Huachuca, Arizona, developed a pencil-and-paper scenario generator for creating low-intensity conflict (LIC) scenarios (Smiley, 1989). Because the material suited the needs of the CTT project, permission was obtained for using the variables in the CTT scenario generator.

The Army's material was perfectly suited for providing a LIC scenario. However, future warfare, though expected to be primarily in the LIC arena, will also include "normal" or high-intensity conflicts as well as mid-intensity conflicts such as Vietnam. The CTT scenario generator adapted the Fort Huachuca version to include variables pertinent to all levels of combat. Also, certain definitions and variables were altered to apply directly to the Air Force and its mission. The Appendix provides a definition of high-, mid-, and low-intensity conflicts.

Besides the Army, there were numerous other sources which provided input into the scenario generator design. Work done by the Logistics and Human Factors Division (LR) of AFHRL at Wright-Patterson AFB, Ohio on Combat Maintenance Capability provided information on collecting contingency skills information (Dunigan et al., 1985, 1986a, 1986b). They had developed a methodology for determining wartime maintenance tasks, whereby maintenance specialists were asked to indicate not specific tasks as contained in a task survey, but work unit codes (WUCs) used for repairs performed on aircraft. The scenario was set at Hahn AB, Germany, during a Warsaw Pact offensive. The CTT objective is obviously different from the LR project. It did, however, provide information on contingency scenario design and task data collection. The Combat Maintenance Capability study evaluated several computer models; most notable were the Logistics Composite Model (LCOM), the Theater Simulation of Airbase Resources (TSAR), and the Theater Simulation of Airbase Resources inputs using AIDA (TSARINA).

Additional information on LIC scenarios and information came from the Army-Air Force Center For Low Intensity Conflict (CLIC) and the Joint Warfare Center.

Similar work to determine wartime medical tasks is being done by the Medical Wartime Hospital Integration Office (MWHIO) at Fort Detrick, Maryland. The project, entitled WARMED, is designed to determine the critical wartime skills needed by medical personnel (Meinders, 1987). Concerns by WARMED directors that the CTT project would overlap their own results and recommendations led AFHRL to avoid the medical field entirely in the scenario generator design.

Other sources of input came from the Air Training Command's Office of Wartime Plans (ATC/DPX) and the Headquarters Air Force Management Engineering Agency (HQ AFMEA), Wartime Manpower Division, both at Randolph AFB, Texas. A concern voiced by HQ AFMEA was the concept of "common tasks." Common tasks are those tasks that are critical for a wartime situation yet are performed by all AFSs. For example, personnel in any specialty should know the tasks required for the donning of protective chemical gear. Common tasks generally involve survival skills in which everyone should be trained. The Air Force, though it trains some common tasks, does not have an active program of ensuring that skills associated with common tasks are learned and maintained by all personnel. The Army does have such a program and routinely tests all soldiers' skills listed in a series of pamphlets appropriately entitled the *Soldier's Manual of Common Tasks* (STP 21-1-SMCT, 1987). The intent of the manual and the concept of common tasks are best summed up by the manual itself:

> The Soldier's Manual of Common Tasks (SMCT)...contains the common tasks that are essential to the Army's ability to win on the modern battlefield. In the event of war, regardless of job or location, each soldier may be exposed to hostile actions. This manual contains the standardized training objectives for the common tasks which will help soldiers fight, survive, and win in combat.

The concept of common tasks in relation to contingency tasks and peacetime tasks is illustrated in Figure 1.

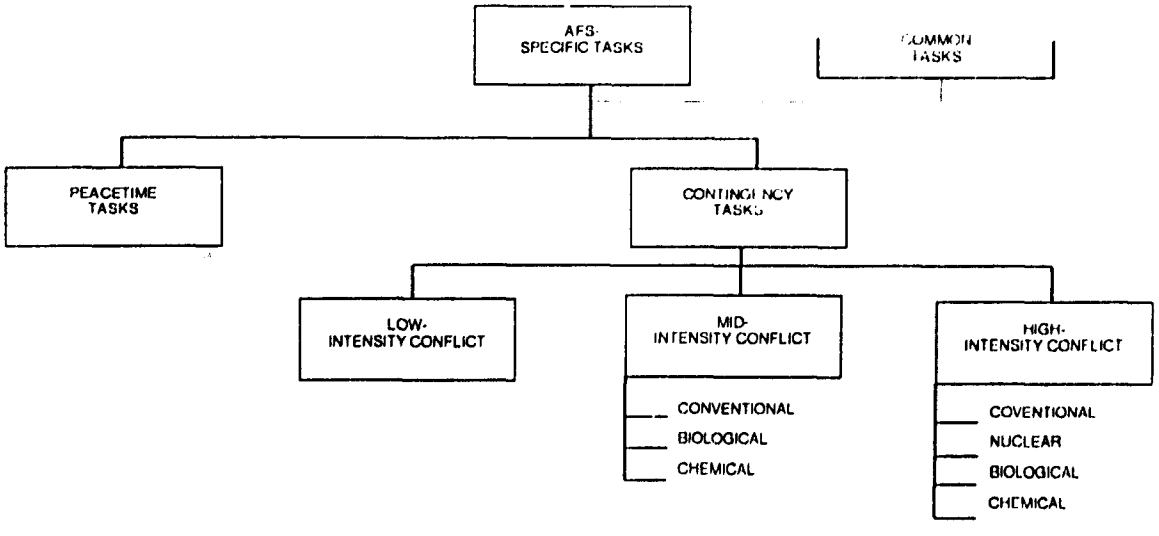

Figure 1. **AFS Task Relationships.**

Preliminary Design

The end result of the literature review and consultations described above was a pencil and paper scenario generator consisting of a list of categories and pertinent variables. A variable dictionary was also created to aid in choosing the correct variables for a scenario. The variables included in the CTT scenario generator which are not found in the Army's LIC generator are mainly factors which describe the environment in greater detail. The choice of variables was based on deLeon's (1973) work, which recommended appropriate material to include in any scenario.

Once a written version of the scenario generator was developed, the feasibility of automating the process became apparent. Development of a computer program to create the scenario greatly enhances the speed and consistency of scenario generation.

Scenario Generator

Once the decision was made to automate the scenario generator, a suitable programming language had to be chosen. Pascal was selected as it provided the necessary versatility and relative ease of use. The program was written with Turbo Pascal version 4.0 and is very simple to use. Speed is enhanced when the program is loaded onto a hard drive or RAM drive. It will run on any DOS-compatible microcomputer. The program consists of two files and is easily contained on a single 360K floppy disk.

The main program, CTT.EXE, presents all the variable categories developed for the paper-and-pencil version. In a step-by-step process, variable choices are entered one at a time and stored in the computer until the last variable is chosen, whereupon all variables are placed in a standard scenario form. In most cases, the variables are simply listed in a sentence format with no additional information. However, in a few of the variables additional information is drawn from a small "library" within the program and displayed in the final scenario. This feature serves to enhance the quality of the scenario produced. Time constraints prevented displaying additional information for all variables, although it is hoped such an improvement will be made in the future.

A useful feature in the program is an on-line 'help' function which when accessed provides a complete definition of all variables listed in the scenario generator. The on-line help definitions are contained in a separate program, CTT_REV.HLP, which must be loaded with the scenario generator program in order to be used.

The program will allow the user to generate low-, medium- and high-intensity conflicts. Special emphasis is given to low-intensity conflicts as these are the most complicated to define and likely to be the type most commonly faced by the U.S. in coming years.

The final scenarios produced by the program are relatively short and uncomplicated, thus meeting the criteria set forth by experts in scenario design. The user has the option to print out the scenario or copy it to a computer disk. If copied to a disk, the scenario can then be modified using any word processor program.

The present report contains only a brief overview of the automated scenario generator. The *Contingency Scenario Generator User's Manual* (Dart & Guthals, 1990) provides a complete introduction to the program and details on how to use and maintain it.

IV. VALIDATION

War Planning Offices

Upon completion of the scenario generator, the next logical step was to evaluate its effectiveness. Evaluation involved conducting what was termed a "reality check." To perform the reality check, the program was taken to several wartime planning offices.

The HQ ATC Technical Training Division (HQ ATC/TTIRP) and HQ AFMEA, both at Randolph AFB, and the School of Aerospace Medicine, Battlefield Readiness Office (USAFSAM/EDO), Brooks AFB, were asked to view the program and provide input for its improvement.

In addition to the above-mentioned sources for scenario evaluation, other sources were contacted concerning specific aspects of the generator; for example, the value for attrition given in the scenario. The Air Force Wartime Manpower, Personnel and Readiness Team (AFWMPRT) at Fort Ritchie, Maryland, provided valuable information in this regard.

Recommendations

The evaluation of the scenario generator by war planning experts led to many valuable and thoughtful recommendations. Those that were easy and straightforward to implement in the time available were incorporated into the scenario generator. Unfortunately, several implementations would have involved complicated procedures or a major reprogramming of the generator. Therefore, although they would enhance the generator, the following recommendations were not implemented:

1. Add a capability to choose two or more variables simultaneously from the same topic.

2. Add a capability to go back one or more screens and change options.

3. Use windows which automatically display variable definitions.

4. Use a different programming language.

5. Calculate attrition based on the variables selected, instead of having it as a selected variable.

6. Improve the definition of attrition in the following ways:

   a. Attrition factors are a mean of 2%/day for defensive actions and 3%/day for offensive action. The main assault area will be triple these figures.

   b. Attrition variables for personnel only (values are number per thousand per day): Battle injury: 0.4 - 10; Killed: 0.1 - 3; Disease: 1.

7. Ensure scenarios generated correlate with Air Force wartime plans.

8. Integrate chemical and biological weapons into the mid-intensity conflict.

V. CONCLUSION

The CTT project has developed a methodology to design contingency scenarios that can be used with task surveys to identify wartime tasks and subsequently, the needed training requirements. The project makes use of the latest information in scenario design and variable definition from both the Air Force and the Army.

Phase I of the CTT project has been completed. The CTT scenario generator has proven to be successful in its attempt to provide a suitable contingency scenario. In fact, although the program was originally designed for use with task surveys at USAFOMC, it has already been adopted by USAFSAM/EDO for designing scenarios for contingency instruction of medical officers.

Phase II of the CTT project, determining wartime skills through task surveys, will be undertaken and completed by USAFOMC.

REFERENCES

Army FM 100-20. (1988). *Low intensity conflict*. Washington DC: Department of the Army.

Dart, T.S., & Guthals, J.A. (1990). *Contingency scenario generator user's manual* (AFHRL-TP-90-74). Brooks AFB, TX: Manpower and Personnel Division, Air Force Human Resources Laboratory.

deLeon, P. (1973). *Scenario designs: An overview* (R-1218-ARPA). Santa Monica, CA: Rand Corporation.

Dunigan, J.M., Dickey, G.E., Borst, M.B., Navin, D., Parham, D.P., Weimer, R.E., & Miller, T.M. (1985). *Combat maintenance capability: Executive summary* (AFHRL-TR-85-35; AD-B097 830L). Wright-Patterson AFB, OH: Logistics and Human Factors Division, Air Force Human Resources Laboratory.

Dunigan, J.M., Dickey, G.E., Borst, M.B., Navin, D., Parham, D.P., Weimer, R.E., & Miller, T.M. (1986a). *Combat maintenance capability: Findings and computer simulation results* (AFHRL-TR-86-46, AD-B106 695L). Wright-Patterson AFB, OH: Logistics and Human Factors Division, Air Force Human Resources Laboratory.

Dunigan, J.M., Dickey, G.E., Borst, M.B., Navin, D., Parham, D.P., Weimer, R.E., & Miller, T.M. (1986b). *Combat maintenance capability project: Methodology* (AFHRL-TR-86-47, AD-B097 830L). Wright-Patterson AFB, OH: Logistics and Human Factors Division, Air Force Human Resources Laboratory.

Meinders, M. (1987, December). Talking Paper on Wartime Medical (WARMED) Work Center Description (WCD). Fort Detrick, MD: Medical Wartime Hospital Integration Office (MWHIO).

Smiley, A.A. (1989, January). *Low intensity conflict scenarios.* Fort Huachuca, AZ: Low Intensity Conflict Study Group, U.S. Army Intelligence Center and School.

STP 21-1-SMCT. (1987, October). *Soldier's Manual of Common Tasks.* Washington, DC: Department of the Army.

USAFOMC. (1979, April). *Air base ground defense tactics analysis* (AFPT 90-811-137, 90-812-138). Randolph AFB, TX: Occupational Survey Branch, USAF Occupational Measurement Center.

BIBLIOGRAPHY

Black, M., Chin, C., Hogan, P., Osborne, B., Simmons, M., & Sylwester, S. (1988, March). *Air Force skill degradation project: Study design*. San Antonio, TX: SRA Corp.

Builder, C. H. (1983, January). *Toward a calculus of scenarios* (N-1855-DNA). Santa Monica, CA: Rand Corporation.

General Dynamics. (1984a). *Combat maintenance capability Phase II report* (FZM 7161). Fort Worth, TX: General Dynamics, Fort Worth Division

General Dynamics. (1984b). *Combat Maintenance capability Phase III Report* (FZM 7199). Fort Worth, TX: General Dynamics, Fort Worth Division.

General Dynamics. (1984c). *Appendix A: Operational scenarios for combat maintenance capability study*. Fort Worth, TX: General Dynamics, Fort Worth Division.

Lewis, O.K., Jr. (1988, February). PUSH-PULL Mobilization and Talking Paper on PUSH-PULL Problems. Randolph AFB, TX: Technical Training for Resources and Policy, Headquarters Air Training Command. Letter to USAFOMC/CC.

Meinders, M. (1988, June). Talking Paper on Medical Readiness System Analysis. Fort Detrick, MD: Medical Wartime Hospital Integration Office (MWHIO).

Van Arsdale, L.A. (1987, December). *A chemical warfare module for airland advanced research model (ALARM)*. Master's thesis, Naval Postgraduate School, Monterey, CA.

APPENDIX: CONFLICT DEFINITIONS

(Extracted from Army FM 100-20, 1988)

HIGH-INTENSITY CONFLICT. War between two or more nations and their respective allies, if any, in which the belligerents employ the most modern technology and all resources in intelligence; mobility; firepower (including nuclear, chemical, and biological weapons); command, control, and communications; and service support.

MID-INTENSITY CONFLICT. War between two or more nations and their respective allies, if any, in which belligerents employ the most modern technology and all resources in intelligence; mobility; firepower (excluding nuclear, chemical, and biological weapons); command, control, and communications; and service support for limited objective under definitive policy limitations as to the extent of destructive power that can be employed or the extent of geographic area that might be involved.

LOW-INTENSITY CONFLICT. Internal defense and development assistance operations involving actions by U.S. combat forces to establish, regain, or maintain control of specific land areas threatened by guerrilla warfare, revolution, subversion, or other tactics aimed at internal seizure of power.

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